BULLETIN No. 1.

Southern Utah Experiment Farm,

ST GEORGE, UTAH.

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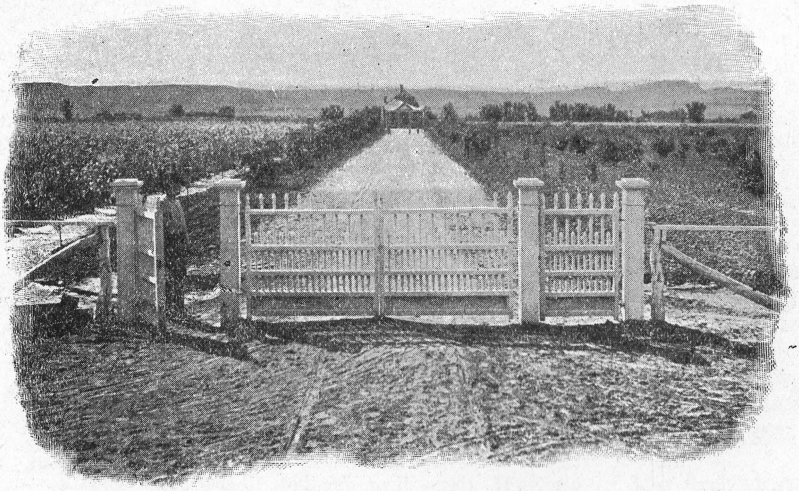
UTAH STATE BOARD OF HORTICULTURE.

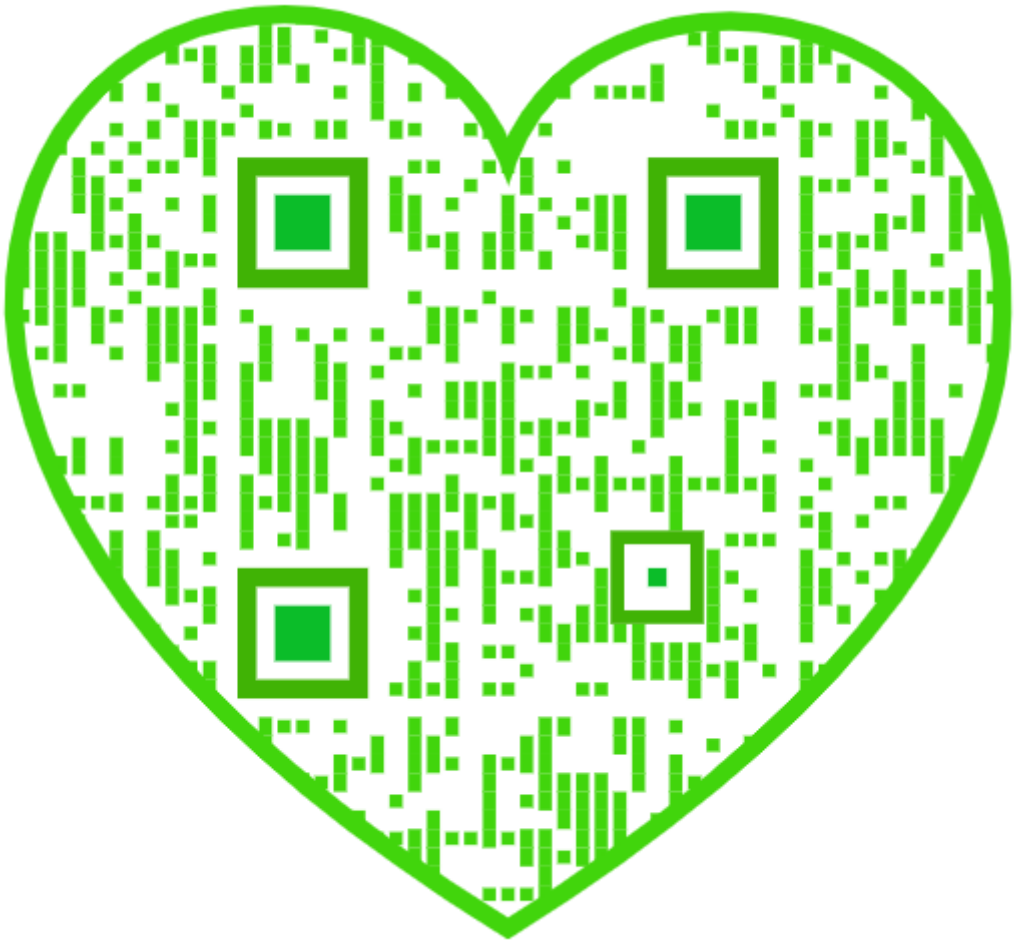
Grape Growing and Rasin Making in Southern Utah.

BY THOMAS JUDD.



THE EXPERIMENT FARM.

SALT LAKE CITY, JANUARY, 1904.



SOUTHERN UTAH EXPERIMENT FARM.

This farm was provided for by act of the Legislature of Utah, approved March, 1899. A commission of three members, appointed by the Governor, chose the site of the experiment farm in July of that year, locating it some four miles east of St. George. Delay in perfecting title to property resulted in deferring all work on the farm until January, 1900. The rough surface and bad condition of the soil made it impossible to plant many vines or trees on the farm prior to the spring of 1901. Even at that date the condition of the soil was such as to render it inadvisable to plant many trees until the surface should be further leveled, and the soil settled and fertilized. In consequence of these unavoidable delays there have been in reality but two growing seasons since the farm was established in which to attain results of experimentation that is being carried on.

A wide range of varieties in all classes of fruits, that will grow in southern Utah, are being tested and brought into bearing for the purpose of determining those most suitable to the climate. The grapes being earliest of all fruit in maturing, have already given some results deemed worthy of publication, and this bulletin is devoted to that purpose.

Trees of other classes of fruit are now developing rapidly and as soon as facts are learned about the different fruits, information concerning them will be given to the public.

HISTORY OF GRAPE CULTURE IN SOUTHERN UTAH.

"The science of life consists in turning a stumbling block into a stepping stone."

In the early sixties some of the first settlers in Washington county, Utah, procured a few vines and cuttings of the wine varieties of grapes that were then most popular in California. The vines were brought overland from California via the old emigrant trail. From the first roots that were planted at St. George the cuttings were sold to the settlers at twenty-five cents each, a price that seems extortionate now, when cuttings of grape vines may be had for the asking.

The very rapid growth and early fruiting of the first vines planted at St. George inspired many of the people of Washington county to plant as extensively as their means would permit, until there was produced in a very few years a considerable crop of grapes of the very highest quality, the fruit being especially rich

in sugar and suited to the making of heavy wine. There being at that time practically no market for the grapes in the fresh state, the only possible means of obtaining revenue from the vineyards seemed to be through converting the grapes into wine. It was hoped that the exceptionally high quality of grapes and the ease with which they could be grown would result in such extensive plantations as would justify the erection of one or more wineries in the "Dixie" country.

Pending the hoped for inauguration of means of converting the grapes into first-class commercial wine, that might be properly bottled, labeled, sealed and put upon the large markets, individuals began the manufacture of wine through crude processes and with varying degrees of success.

It was clearly demonstrated that the best wines could be made from the grapes at hand, but it also became patent that proper processes of manufacture and handling were absolutely necessary to the production of a grade of wine that could find a place on the market. The project of building suitable wineries lagged and diversified industries springing up, the effort at wine production became desultory and the interest began to wane. The large plantations prerequisite to the establishment of a commercial winery did not materialize, and those who had already planted largely of grape vines continued to convert the annual crop into wine after their own ideas of manufacture, resulting in a considerable vintage each year of wine that generally ranked as inferior. Not enough of merchantable wine was made in any one season to justify an attempt at export, and too much was produced to find sale within the settlements. This condition has prevailed from the beginning of grape growing in St. George up to the present time, until very many of the best citizens of Washington county look upon wine-making as not only a profitless undertaking, but one that is demoralizing because of the consumption in excess of the inhabitants of the county.

While not ignoring the moral phase of the question, the writer hereof has been convinced for a number of years that the wonderful adaption of soil, season and climate of Washington county to grape production should be taken advantage of to grow a commercial product in the shape of fresh grapes as well as raisins. Personal experience has proven beyond the possibility of a doubt that raisins made from grapes grown in southern Utah will compare favorably with the best in the world, this being the verdict of commercial experts who have repeatedly sampled the Wshington county products.

From his own success in raisin making, the writer determined to make the first work at the Southern Utah Experiment Farm a demonstration of the feasibility of growing the best raisin grape, and of converting the fruit into a commercial product that could be placed upon the market to bring revenue into the country.

The earliest results are here given with full knowledge that still further demonstration and experiment will be required, yet it is hoped that sufficient is already shown to impel many of the people of southern Utah to abandon the profitless and really harmful wine-making for the certain profit of growing fresh grapes for the market and for making into raisins.

RAISIN MAKING AS A UTAH INDUSTRY.

It is not intended to give specific directions in this bulletin for the simple processes of handling, curing, cleaning, and packing the raisins for market. Such information will be fully set forth in a future publication. It is sufficient here to say that the labor connected with every step in the process of raisin culture, from the cultivation of the vine up to boxing and labeling the finished product is light, pleasant and interesting. In countries where raisins are produced commercially employment is given throughout a considerable portion of the year to women, boys and girls. Some of the most expert workers in the large raisin fields of California are young men and women yet in their teens. The raisin industry affords employment at fair wages to all members of the family and to a very large number of others during the busiest season. The wages paid to laborers is derived from sale of the product to the outside markets, thus bringing in and adding to the circulating medium in the district.

In short, the raisin industry is to the vineyardist in the favored grape regions of Utah all and even more than the creamery is to the dairyman, the canning factory to the truck farmer, or the sugar factory to the beet grower.

PROFITS OF THE RAISIN INDUSTRY.

It is an easy matter to show up phenomenal yields and enormous profits in any industry. That there are exceptional seasons when all special crops yield surprising revenue is, of course, well known. Such experience has fallen to the happy lot of the raisin grower when profits reaching as high as $300 per acre have been obtained. While it is well to keep these possibilities in mind as an incentive to supreme endeavor, conservatism demands that the average results be used as a basis for computing probable returns from a raisin field. With 800 vines to an acre it is safe to calculate on a yield of 9,000 pounds of fresh grapes. The average grapes grown for raisins will produce about one pound of finished product to three and a half pounds of fresh fruit. With 2,500 pounds of cured raisins at even 4 cents per pound to the grower there is clearly a

revenue of $100 per acre. That this estimate is eminently conservative will be attested by all persons who have had experience in grape growing. The figures here given are based upon a yield of less than twelve pounds of fresh grapes to each vine, while actual experience shows that fifteen to twenty-five pounds is more nearly the yield of mature vines. Figures might be given showing an income of more than $200 per acre from raisins produced near St. George, but, for the sake of conservatism, the more moderate figures are used. Granted that $100 per acre may be reasonably expected from a raisin field, the industry assumes great importance to the citizens of Washington County. Without materially interfering with the production of the food stuffs and forage crops needed by the inhabitants of the locality mentioned, it is perfectly safe to say that there are in the various settlements an aggregate of 1,000 acres that could be immediately devoted to growing of grapes for manufacture into raisins. Given 1,000 acres devoted to the growing of raisin grapes, there would be at a safe calculation a revenue of $100,000 coming to the people of the county annually.

This revenue would come wholly from outside sources and would be distributed to the growers and laborers, thus bringing material prosperity to the community.

It is undoubtedly true that the continued success that must inevitably attend raisin making when properly conducted would induce a very considerable portion of the farmers to engage in the enterprise, until the 1,000 acres of vineyards suggested would extend to double that area.

The opportunity is at hand for the farmers of Washington County to engage in an industry that is at once pleasant, profitable and legitimate, and for which the Southern Utah Experiment Station is prepared to furnish all necessary instructions and assistance.

THE RAISIN GRAPES.

The first raisins that attracted the attention of the world as a production of California were made from the Muscat grapes. These grapes being of large size, fine quality and growing in bunches of more than ordinary size, were for a number of years considered the standard variety for converting into raisins. There are at least three varieties that go under the name of Muscat grapes, and the distinguishing features of the three are so slight as to require little notice in this connection. Even the best authorities in California are divided in opinon as to the difference between the "Muscatel," "Muscat of Alexandria" and "Muscatel Gordo Blanco." It is believed, however, that if there is any difference, the Muscatel Gordo Blanco is the variety that has been successfully grown in Utah. This variety is so well known as a raisin grape that nothing short

of an extra superior variety may ever be looked to as its successor. For flavor, size and general excellence of appearance as a finished product the Muscat raisin still retains its place at the very head of raisin grapes. However, the whims and niceties of the trade in late years have demanded a commercial raisin without seeds. Expensive machinery has been devised by means of which the Muscat grape is converted into a seedless raisin of commerce. Thus the old popular variety of raisins has in a measure been able to hold its own. But the world moves and in fruit creations no less than in other inventions new and better things are being produced.

THE THOMPSON SEEDLESS GRAPE.

In 1878 the Sutter County, California, Horticultural Society named a new and seedless variety of grape the "Thompson Seedless." The first cuttings of this grape were procured from Ellwanger & Barry of Rochester, New York, and it was said by them to be a grape from Constantinople called the "Lady Decoverly." The new grape grew rapidly in popularity and was soon conceded to be far superior to the Sultana which had, prior to this, been the popular seedless grape for raisin making. Knowing of this popular variety as a seedless raisin grape,the aim has been to thoroughly test the Thompson Seedless at the experiment farm before recommending it to the people of Utah. The variety had already been very successfully grown in Washington County, but no data had been kept as to yield, growth, etc. The short records at hand from experiments at the station fully corroborate all that has been claimed for the Thompson Seedless as a raisin grape.

It should be stated in this connection that during the irrigation season of 1900 the Washington Field Canal was washed out by a flood which did great damage to the newly planted vines on the experiment farm. After the flood subsided the farm was without water for fifty-two days, which worked a still further injury. It is, therefore, hardly a fair test here recorded as to what the several varieties would accomplish under ordinary conditions.

The 35 vines of Thompson Seedless grapes that were planted at the experiment station in 1900 showed the first sample of fruit in 1902. The first ripe grapes were picked August 19, 1903, and the crop continued to ripen during the next sixty days. The average yield was 13½ pounds to the vine, making 3½ pounds of raisins; one specially vigorous vine on trellis giving 29 pounds of grapes that made 8½ pounds of cured raisins. These latter figures are about the average production expected by vineyardists whose vines have reached maturity. The vine is hardy and a vigorous grower, and should be grown on a trellis instead of the stump plan, as practiced with most other varieties in this locality. The clusters are large and long, some bunches measuring 15 inches. The berry is larger than the Sultana, oval in shape and beautiful amber color when

ripe. Owing to the tendency to make great growth of wood, the Thompson Seedless should be planted on light, well-drained soil. From all accounts of the best authorities it is believed that the Thompson Seedless is the best of its class now known.

Professor Bioletti of California pronounces the Thompson Seedless as identical with the seedless Sultana of Asia Minor, which grape is conceded to be the best in the world. While it is not intended to disparage the Muscat as a raisin grape, still we venture the suggestion that the demand of the trade for seedless raisins be met by growing the grapes that have no seeds, and thus obviate the expense incident to removing the seeds by machinery, as is now practiced by those who grow the Muscat for raisin making. We unhesitatingly recommend the Thompson Seedless as the best grape of its class for the southern grape district of Utah.

THE MUSCATEL GORDO BLANCO.

This grape, variously named the Muscatel, Muscat, Muscat of Alexandria and Muscatel Gordo Blanco, is well known and very popular in Southern Utah. While some good authorities insist that there is no real distinction between the grapes grown under the various names, others claim that the Muscatel Gordo Blanco is superior to the others and the distinguishing features are: "A lower depressed growth of vine, closer cluster, rounder berry and thicker and finer bloom." It is confidently believed that the Muscatel Gordo Blanco is the true name of the grape at the Southern Utah Experiment Farm. The thirty vines of this variety in the test did not bear out the well established reputation of the Muscatel Gordo Blanco, the cause of the light yield being due largely to the poor quality of soil. The vines yielded only five pounds of fresh fruit on the average, the greatest yield of any one vine being eleven pounds. It is known, however, that the Muscatel Gordo Blanco will succeed in all the grape regions of Southern Utah, and we recommend the variety as one of the best and most profitable. In nearly every market the Muscat grape is popular, either for table use or as a raisin. This variety should be grown on rich soil and trained to the stump form.

A GOOD COMMERCIAL GRAPE.

The long haul by wagon necessary to market the products of Washington County has heretofore deterred vineyardists from attempting to market their grapes in the fresh state. Most of the choice grapes being of rather thin and tender skin, it was deemed hazardous to ship them by wagon to the railroad, sixty to ninety miles distant. It has long been desired that a grape be discovered combining hardiness of vine,prolific yield, good size and appearance with high quality. To this end many varieties are being tested at the Experiment Farm. The Black Cornichon has proven the best grape so far tested. Vines of this variety planted in 1900 showed samples of fruit the second year. In 1903, the vines had attained a good growth on the stump plan. Forty vines yielded an average of 11 pounds of grapes each. The season of ripening lasted from September 8 to November 9. The Black Cornichon vine is a medium grower, with very firm wood. The berry is oblong, inclined to tapering, and is noticeable for its peculiar shape and great beauty, its black skin with a rich purple hue making it one of the most attractive of grapes. The bunches are medium in size, long and rather loose in cluster. The skin is thick and the berry very firm. The Cornichon should be grown on the stump plan and given fertile soil with good cultivation and drainage. When thus treated it is one of the most prolific varieties.

In the long and favorable season of Southern Utah the Black Cornichon reaches the greatest perfection, and makes one of the most delicious table grapes. Because of its firmness and tough skin it is thought that the Black Cornichon is one of the very best varieties to plant for shipment in the fresh state to distant markets. Grapes of this variety shipped in 1903 from the experiment station to Ogden arrived at destination in perfect condition, and were greatly admired in the exhibition at the Irrigation Congress. It is recommended that the Black Cornichon be planted liberally by all who desire to grow grapes for distant markets. It should be here noted that the Black Cornichon season lasts far into November, thus making this variety in great demand after others are gone. California growers are taking very kindly to the Black Cornichon as a shipping grape for table use. Large quantities of this variety were imported into Utah in 1903, and it was one of the most popular grapes on the market. From the experience up to date it is confidently expected that the Black Cornichon will prove the most profitable table grape for Southern Utah growers to handle.

GRAFTING THE GRAPE.

The principles underlying the grafting of grape vines are the same as apply to this method of propagating other fruits. The root or stock being vigorous and free from disease, it may be desired that a different variety of grape be grown on this root. To effect the change a scion or small cutting of wood from a vine of the desired variety is grafted into the root or stock of the undesired variety. When vines to be grafted are three years old or over, the common and successful method of grafting is to clear away the soil and cut the old vine off horizontally two or three inches below the surface of the soil, with a fine toothed saw or sharp knife. Then, with a chisel, split the stub through the center and prepare your scions of the desired variety. These scions should be of last season's growth, and one bud near the end. The other end of the scion should be cut with a very sharp knife to a long wedge shape, leaving the outer side a trifle thicker than the inner. In the cleft made by the chisel the scions should be placed one on each side of the cleft with the cambium or soft inner layer of bark, in direct contact with the similar layer under the bark of the stump. When the chisel is withdrawn the stump will clasp the two scions so as to hold them in place. The bud on the scions should be about two inches above the stump when the operation is completed. The union of the stump and scion should be covered with wet clay, and over this an inch or so of very fine dry dirt, leaving the bud in the scions barely out at the surface of the soil. The scions should be cut from the desired vines while the wood is perfectly dormant, and should be kept moist (but not wet) and cool until used. The proper time to do the grafting is just when the vines are ready to begin growth in the spring.

The above directions will enable any person to graft his vineyard over from varieties that are undesirable into either the Muscatel Gordo Blanco or Thompson Seedless for raisins, or into the Black Cornichon for a commercial grape. Scions of either of these varieties may be obtained in reasonable number free of charge by application to the Southern Utah Experiment Farm, St. George, Utah. The scions can be sent by mail.

RESISTANT VINES.

So far as we are advised the phylloxera, which has worked sad havoc on the grape vines of France and even California, has not made its appearance in Utah. However, it is well to be guided by the costly experience of others by getting grape roots of the resistant stocks that have proven immune from the phylloxera in all countries where tried. The Rupestris St. George is regarded as the strongest resistant stock. With a view to securing resistant stock for distribution there has been planted a large number of Rupestris St. George vines at the Southern Utah Experiment Farm. These vines are very vigorous growers, and a large number of cuttings are now ready for free distribution. It is strongly recommended that in every case where a new vineyard is to be set out, the cuttings or roots of resistant vines be used for a foundation. After two seasons' growth from the cuttings the roots thus obtained may be grafted into varieties desired to produce either raisin or commercial grapes. The extra vigor of the resistant roots, in addition to the perfect protection against the phylloxera, will far more than pay for the trouble and delay of obtaining the resistant roots and the grafting that is necessary.

GRAPE NOTES.

Soil that is adapted to grape culture will yield four times as much revenue from raisin grapes as from lucern.

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Grapes should never be planted on low, wet ground, nor among other classes of fruit. Too much irrigation is sure to follow if grape vines are grown with other things. Let the vineyard be by itself and the different varieties of grapes in separate rows. This latter is advisable because of the different culture and irrigation suited to the different varieties.

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Bishop E. W. Bunker, forty miles southwest of St. George, harvested and sold 11,000 pounds of Thompson Seedless raisins from three acres of vineyard in 1903. The crop was only an average one, and this fact goes to show that estimates given elsewhere in this bulletin are very conservative.

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Up to the present time no insects have appeared to injure the grape vines in Southern Utah. There is an occasional appearance

of grape mildew in the form of a grayish white coating on the leaves and darker spots on the fruit. The ordinary remedy for grape mildew is to apply finely powdered sulphur by means of a hand bellows after the vines have first been sprayed with clear water. It is recommended also that the Bordeaux mixture be used as a spray when the young leaves are opening; also that the winter spray of lime, salt and sulphur be used while the vines are dormant. The lime, salt and sulphur spray kills all forms of insect life and is also a preventive of fungus disease.

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When the product of the soil can be concentrated into small compass, as in packages of cured raisins, so that $200 to $300 worth may be loaded into one freight wagon, distance from the railroad ceases to be a barrier to the industry.

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The suggestions and recommendations made in this bulletin for Washington County are applicable to portions of Garfield and Kane Counties, and the fruit districts of Grand County.

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Cuttings and scions of the varieties of grapes mentioned in this bulletin will be sent free by mail to citizens of Utah upon application to

SOUTHERN UTAH EXPERIMENT FARM,
St. George, Utah.